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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SINGH, RAMNANDAN P

ART UNIT	PAPER NUMBER
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2646

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/784,827

Applicant(s)

PRENDERGAST ET AL

Examiner

Ramnandan Singh

Art Unit

2646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 6-16 and 19-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26-29 is/are allowed.
- 6) ☒ Claim(s) 1,4,6-16,19-25 and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date May 04, 2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 11, 2005 has been entered.

2. Status of Claims

Claim 1 is amended.

Claims 2-3, 5, 17-18 are pending.

New claims 26-32 are added.

Claims 1, 4, 6-16 and 19-32 are pending.

Claim Objections

3. Claim 20 is objected to because of the following informalities: Claim 5 recites the limitation "The isolation system of claim 5" in line 1. Since claim 5 has been cancelled, the reference to claim 5 made here is incorrect. For this Office action, Examiner assumes that this reference is with respect to claim 1 (not 5). Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 1, 4, 6-7, 13-16, 21-25 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ehlig et al [US 5,550,993] in view of Davis et al [US 4,539,552].

Regarding claim 1, Ehlig et al teach analog communication across an isolation barrier in the form of a data access arrangement (DAA) shown in Figs. 10-12, wherein this DAA may comprise a single isolation element or a mixture of multiple isolating elements in parallel such as capacitors, transformers, and optical isolators. The analog communication system comprises an encoder (527) having a digital input ($d_s \cdot nT$), a digital to analog (D/A) converter (539) having a digital input, $S(nT_s)$ and an analog output $S(t)$ connected to the DAA; an analog to digital (A/D) converter (521) having an input coupled to the analog output of the DAA for providing a digital output [Figs. 10-12; col. 31, lines 14-61].

However, Ehling et al do not disclose the construction of the digital to analog (D/A) converter 539. So one of the ordinary skill in the art would have been motivated to seek any D/A circuit suitable to receive a digital input and convert the digital input into an analog output, such as the D/A circuit of Davis et al.

Davis et al teach a digital-to-analog converter that also provides a constant average analog output signal [Davis et al: Fig. 9; col. 18, lines 53-59; col. 2, lines 20-26; col. 1, lines 60-63]. It is nevertheless a teaching to one of ordinary skill in the art to apply the same to other applications.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the digital to analog circuit of Davis et al for the digital to analog (D/A) converter 539 of Ehlig et al in order to ensure constant operating performance and reduced spurious signals [Davis et al; col. 2, lines 27-30].

Regarding claim 4, Ehling et al further teach an analog to digital (A/D) converter (521) having an input coupled to the analog output of the DAA for providing a digital output [Fig. 11] and is configured to decode (551) the constant average input analog signal [Fig. 12].

Claims 6 and 7 are essentially similar to claim 4 and are rejected for the reasons stated above.

Regarding claims 13-16, Ehlig et al teach data and control information [Fig. 16] supplied by two-way communication paths DSP 653 and a second device 11 [col. 32, lines 66-67; col. 33, lines 1-16].

Regarding claim 25, Ehling et al further teach the isolation system having an analog to digital (A/D) converter (521) with an input coupled to the analog output of the DAA for providing a digital output [Fig. 11] and configured to decode (551) the constant average input analog signal [Fig. 12].

Regarding claim 30, the combination of Ehlig et al Davis et al further teaches the D/A circuit, wherein the digital signal provided by the encoder circuit includes two digital values (i.e. four levels) in response to each digital values [Davis et al; Figs. 9-10; col. 13, lines 5-20].

Regarding claim 31, the combination of Ehlig et al Davis et al further teaches the D/A circuit, wherein the output codes of the encoder is determined by the number of "1" contained in it [Davis et al; Fig. 3; col. 5, line 56 to col. 6, line 8].

Regarding claim 21, Ehlig et al teach a bi-directional isolation system with analog communication across a DAA (787), as shown in Fig. 18, wherein the DAA inherently comprise a single isolation element or a mixture of multiple isolating elements in parallel such as capacitors, transformers, and optical isolators. The analog communication system comprises a digital to analog (D/A) converter (539) having an analog output $S(t)$ connected to the DAA; an analog to digital (A/D) converter 785 having an input coupled to the analog output of the DAA (787) for providing a digital output [Figs. 10-12, 18; col. 31, lines 14-56; col. 34, lines 15-34].

Regarding claims 22-23, Ehlig et al teach analog communication with a bi-directional isolation system 787 [Fig. 18; element 785].

Regarding claim 24, Ehlig et al teach an echo canceller 515 to improve the transmission of a communication circuit [Fig. 9; col. 27, lines 54-62; col. 31, lines 7-13].

Claim 32 is essentially similar to claim 21 and is rejected for the reasons stated above.

6. Claims 10, 12 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ehlig et al and Davis et al as applied to claims 1, 4 above, and further, in view of Yurgelites [US 5,500,895].

Regarding claim 10, Ehlig et al teach a generic DAA; it does not disclose expressly an isolation element, such as capacitor of the DAA.

Yurgelites discloses analog communications using a DAA 22 having a capacitive isolation barrier using capacitors as shown in Fig. 2 [Figs. 1-3; col. 1, line 59 to col. 2, line 24; col. 3, lines 12-67].

Ehlig et al, Davis et al and Yurgelites are analogous art because they are from a similar problem solving area, viz. , telephonic communications across a DAA.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the isolation element of the DAA of Yurgelites with Ehlig et al.

The suggestion/motivation for doing so would have been to provide an explicit description of the DAA for its operational use with the Ehlig et al system.

Regarding claim 12, Yurgelites teaches the analog communication technique that significantly reduces common mode noise [col. 4, lines 47-58].

Regarding claim 19, the combination of Ehlig et al and Davis et al teaches an isolation system [Ehlig et al; Figs. 10, 12, 18] in which the input analog signal is a constant average signal to the isolation system [Davis et al; Fig. 9; col. 18, lines 53-59].

Claim 20 is essentially similar to claim 19 and is rejected for the reasons stated above apropos of claim 19.

7. Claims 8-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ehlig et al and Davis et al as applied to claim 1 above, and

further, in view of either Scott et al [US 6,587,560 B1] or Rahamim et al [US 6,081,586].

Regarding claims 8-9 and 11, Ehlig et al teach a generic DAA; it does not disclose expressly an isolation element, such as capacitor or a transformer of the DAA and a termination resistance. However, these elements for a DAA are well known in the art of both analog and digital communications across an isolation barrier.

Scott et al discloses analog communications across a DAA having isolation barriers with capacitors and transformers [col. 2, line 15 to col. 3, line 8].

Ehlig et al, Davis et al and Scott et al are analogous art because they are from a similar problem solving area, viz. , telephonic communications across a DAA.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the isolation element of the DAA of Scott et al with the combination of Ehlig et al and Davis et al.

The suggestion/motivation for doing so would have been to provide an explicit description of the DAA for its operational use with the Ehlig et al system.

Regarding claims 8-9 and 11, the combination of Ehlig et al, Davis et al and Rahamim et al discloses a DAA having isolation barriers with capacitors and transformers [Rahamim et al; Figs. 3B-3E]; and teach terminating resistances 412, 413 and 430, 426 across the isolation barrier [Rahamim et al; Fig. 5].

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ehlig et al and Davis et al as applied to claims 1-7 above, and further in view of Chea, Jr. [US 4,387,273].

Regarding claim 12, the combination of the combination of Ehlig et al and Davis et al does not teach expressly a common mode interference signal sensing circuit and a summing circuit to remove the common mode interference signal.

Chea, Jr. teaches a common mode interference signal sensing circuit and a summing circuit to remove the common mode interference signal [col. 2, lines 64-67; col. 3, lines 1-3; col. 6, lines 36-54; col. 1, lines 55-67].

Ehlig et al and Chea, Jr. are analogous art because they are from a similar problem solving area, viz. , telephonic communications.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the common mode rejection technique of Chea with the combined system Ehlig et al.

The suggestion/motivation for doing so would have been to reduce the power dissipation in the interface circuitry of the isolation barrier [Chea, Jr. ; col. 1, lines 7-12].

Response to Arguments

9. Applicant's arguments filed on May 11, 2005 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

10. Claims 26-29 are allowable.

The following is an examiner's statement of reasons for allowance:

Claim 26 identifies the uniquely distinct feature of an isolation system with analog communication across an isolation barrier comprising: an isolation barrier circuit having at least one isolation element; a digital to analog circuit configured to provide a constant average analog output signal to the isolation barrier and having an input for receiving an input digital signal to be communicated across the isolation barrier; the digital-to-analog circuit including a digital to analog converter with an input for receiving the input digital signal and an analog modulation circuit responsive to the digital to analog converter for

providing the constant average analog output signal; and an analog to digital circuit having an input coupled to the analog output of the isolation barrier circuit for providing a digital output signal. As such, claim 1 requires an analog modulation circuit responsive to the digital to analog converter (D/A) for providing the constant average analog output signal, as shown in applicant's Figure 12. While the closest prior art, Ehlig et al [US 5,550,993] and Davis et al [US 4,539,552] each teach using a digital-to-analog (D/A) converter, Ehlig et al using D/A for analog communication across an data access arrangement (DAA), and Davis et al using D/A for maintaining a constant average output signal level, neither Ehlig et al nor Davis et al show or suggest to utilize an analog modulation circuit responsive to the digital to analog converter (D/A) for providing the constant average analog output signal. As such, the prior art, either singularly or in combination, fail to anticipate or render the above limitation obvious. Therefore, claim 26 is allowable.

Claims 27-29 are allowable due to dependence from claim 26.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (571) 272-7529. The examiner can normally be reached on M-TH (8:00-5:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ramnandan Singh
Examiner
Art Unit 2646

A handwritten signature in black ink, appearing to be 'R Singh', written over a horizontal line.

SINH TRAN
SUPERVISORY PATENT EXAMINER